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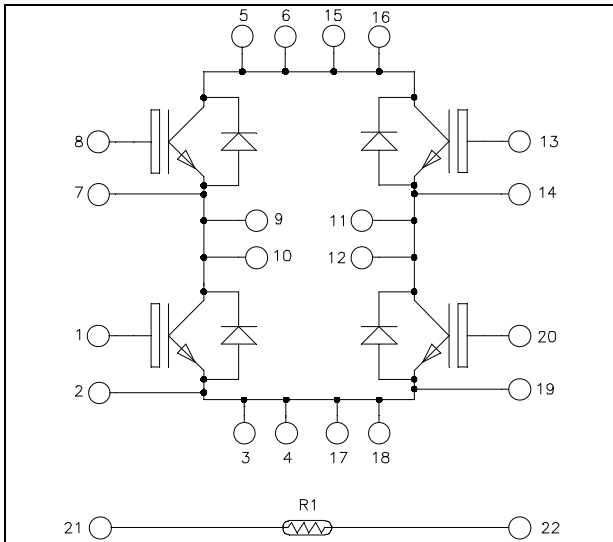
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**Full - Bridge
Trench + Field Stop IGBT3
Power Module**

**$V_{CES} = 600V$
 $I_C = 75A @ T_c = 80^\circ C$**

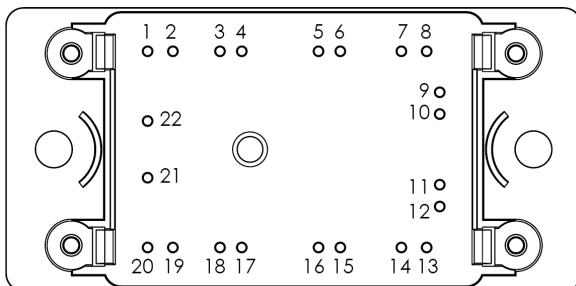


Application

- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

Features

- Trench + Field Stop IGBT3 Technology
 - Low voltage drop
 - Low tail current
 - Switching frequency up to 20 kHz
 - Soft recovery parallel diodes
 - Low diode VF
 - Low leakage current
 - RBSOA and SCSOA rated
- Very low stray inductance
- Internal thermistor for temperature monitoring
- High level of integration



Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Solderable terminals both for power and signal for easy PCB mounting
- Low profile
- RoHS Compliant

Pins 5/6/15/16 ; 3/4/17/18 ; 9/10 ; 11/12 must be shorted together

All ratings @ $T_j = 25^\circ C$ unless otherwise specified

Absolute maximum ratings (per IGBT)

| Symbol | Parameter | Max ratings | Unit |
|-----------|---------------------------------------|---------------------|-------------|
| V_{CES} | Collector - Emitter Breakdown Voltage | 600 | V |
| I_C | Continuous Collector Current | $T_c = 25^\circ C$ | 100 |
| | | $T_c = 80^\circ C$ | 75 |
| I_{CM} | Pulsed Collector Current | $T_c = 25^\circ C$ | 140 |
| V_{GE} | Gate - Emitter Voltage | ± 20 | V |
| P_D | Maximum Power Dissipation | $T_c = 25^\circ C$ | 250 |
| RBSOA | Reverse Bias Safe Operating Area | $T_j = 150^\circ C$ | 150A @ 550V |

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on www.microsemi.com

Electrical Characteristics (per IGBT)

| <i>Symbol</i> | <i>Characteristic</i> | <i>Test Conditions</i> | <i>Min</i> | <i>Typ</i> | <i>Max</i> | <i>Unit</i> |
|---------------|--------------------------------------|-----------------------------------|---------------------|------------|------------|-------------|
| I_{CES} | Zero Gate Voltage Collector Current | $V_{GE} = 0V, V_{CE} = 600V$ | | | 250 | μA |
| $V_{CE(sat)}$ | Collector Emitter Saturation Voltage | $V_{GE} = 15V$ $I_C = 75A$ | $T_j = 25^\circ C$ | 1.5 | 1.9 | V |
| | | | $T_j = 150^\circ C$ | | 1.7 | |
| $V_{GE(th)}$ | Gate Threshold Voltage | $V_{GE} = V_{CE}, I_C = 600\mu A$ | 5.0 | 5.8 | 6.5 | V |
| I_{GES} | Gate – Emitter Leakage Current | $V_{GE} = 20V, V_{CE} = 0V$ | | | 600 | nA |

Dynamic Characteristics (per IGBT)

| <i>Symbol</i> | <i>Characteristic</i> | <i>Test Conditions</i> | <i>Min</i> | <i>Typ</i> | <i>Max</i> | <i>Unit</i> |
|---------------|-------------------------------------|---|---------------------|------------|------------|--------------|
| C_{ies} | Input Capacitance | $V_{GE} = 0V$ $V_{CE} = 25V$ $f = 1MHz$ | | 4620 | | pF |
| C_{oes} | Output Capacitance | | | 300 | | |
| C_{res} | Reverse Transfer Capacitance | | | 140 | | |
| Q_G | Gate charge | $V_{GE} = \pm 15V, I_C = 75A$ $V_{CE} = 300V$ | | 0.8 | | μC |
| $T_{d(on)}$ | Turn-on Delay Time | Inductive Switching ($25^\circ C$) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 75A$ $R_G = 4.7\Omega$ | | 110 | | ns |
| T_r | Rise Time | | | 45 | | |
| $T_{d(off)}$ | Turn-off Delay Time | | | 200 | | |
| T_f | Fall Time | | | 40 | | |
| $T_{d(on)}$ | Turn-on Delay Time | Inductive Switching ($150^\circ C$) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 75A$ $R_G = 4.7\Omega$ | | 120 | | ns |
| T_r | Rise Time | | | 50 | | |
| $T_{d(off)}$ | Turn-off Delay Time | | | 250 | | |
| T_f | Fall Time | | | 60 | | |
| E_{on} | Turn-on Switching Energy | $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 75A$ $R_G = 4.7\Omega$ | $T_j = 25^\circ C$ | 0.35 | | mJ |
| | | | $T_j = 150^\circ C$ | 0.6 | | |
| E_{off} | Turn-off Switching Energy | $I_C = 75A$ $R_G = 4.7\Omega$ | $T_j = 25^\circ C$ | 2.2 | | mJ |
| | | | $T_j = 150^\circ C$ | 2.6 | | |
| I_{sc} | Short Circuit data | $V_{GE} \leq 15V ; V_{Bus} = 360V$ $t_p \leq 6\mu s ; T_j = 150^\circ C$ | | 380 | | A |
| R_{thJC} | Junction to Case Thermal Resistance | | | | 0.60 | $^\circ C/W$ |

Reverse diode ratings and characteristics (per diode)

| Symbol | Characteristic | Test Conditions | | Min | Typ | Max | Unit |
|-------------------|---|---|------------------------|-----|------|------|------|
| V _{RRM} | Maximum Peak Repetitive Reverse Voltage | | | 600 | | | V |
| I _{RM} | Maximum Reverse Leakage Current | V _R =600V | | | | 250 | μA |
| I _F | DC Forward current | | T _c = 80°C | | 75 | | A |
| V _F | Diode Forward Voltage | I _F = 75A V _{GE} = 0V | T _j = 25°C | | 1.6 | 2 | V |
| | | | T _j = 150°C | | 1.5 | | |
| t _{rr} | Reverse Recovery Time | I _F = 75A V _R = 300V di/dt = 2000A/μs | T _j = 25°C | | 100 | | ns |
| | | | T _j = 150°C | | 150 | | |
| Q _{rr} | Reverse Recovery Charge | I _F = 75A V _R = 300V di/dt = 2000A/μs | T _j = 25°C | | 3.6 | | μC |
| | | | T _j = 150°C | | 7.6 | | |
| E _r | Reverse Recovery Energy | I _F = 75A V _R = 300V di/dt = 2000A/μs | T _j = 25°C | | 0.85 | | mJ |
| | | | T _j = 150°C | | 1.8 | | |
| R _{thJC} | Junction to Case Thermal Resistance | | | | | 0.98 | °C/W |

Temperature sensor NTC

| Symbol | Characteristic | Min | Typ | Max | Unit |
|-----------------------------------|----------------------------|-----|------|-----|------|
| R ₂₅ | Resistance @ 25°C | | 22 | | kΩ |
| ΔR ₂₅ /R ₂₅ | Resistance tolerance | | | 5 | % |
| ΔB/B | Beta tolerance | | | 3 | |
| B _{25/100} | T ₂₅ = 298.16 K | | 3980 | | K |

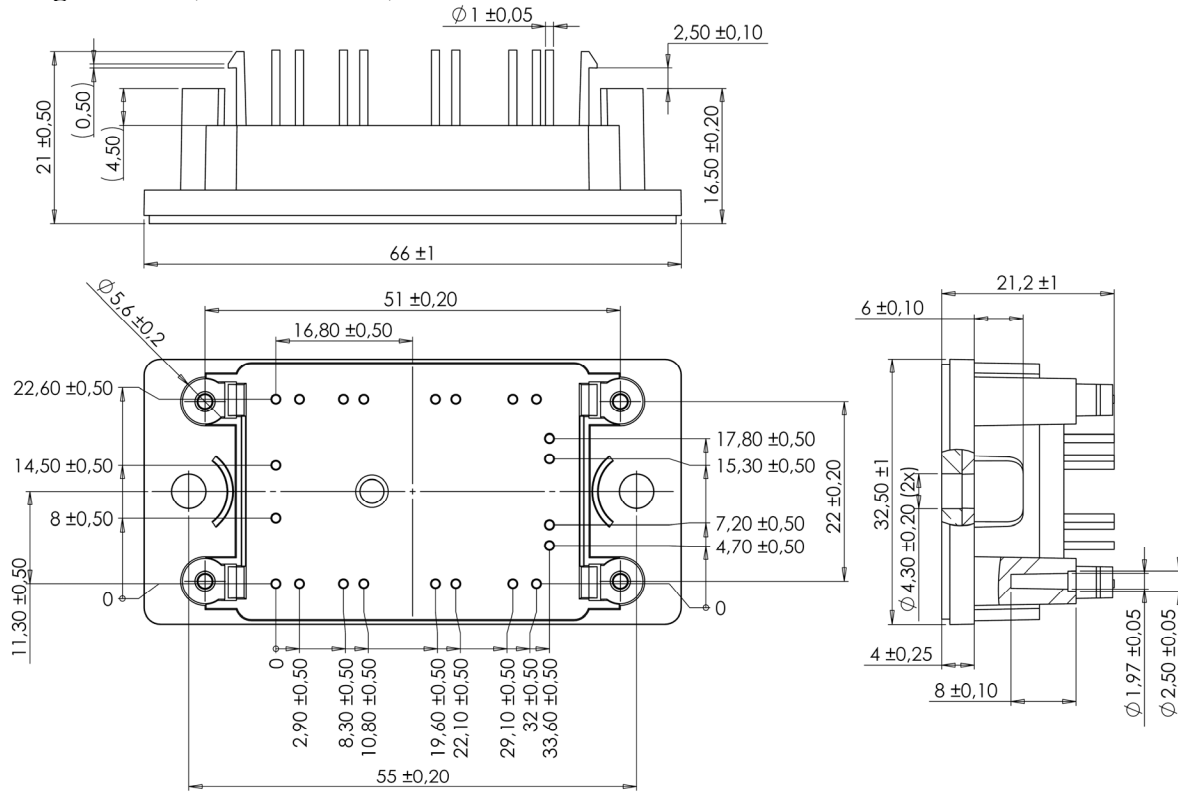
$$R_T = \frac{R_{25}}{\exp\left[B_{25/100}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

T: Thermistor temperature
 R_T: Thermistor value at T

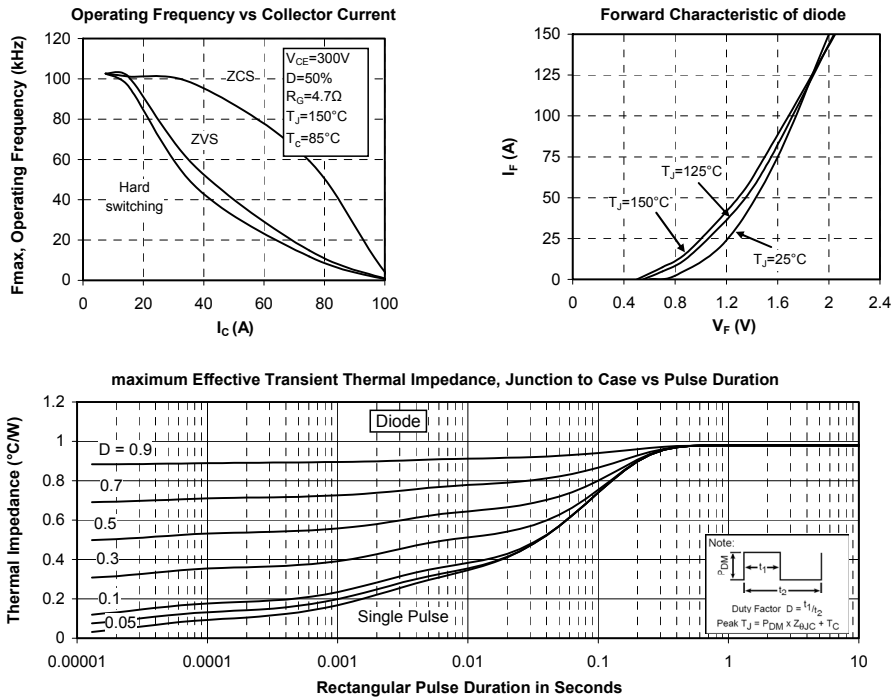
Thermal and package characteristics

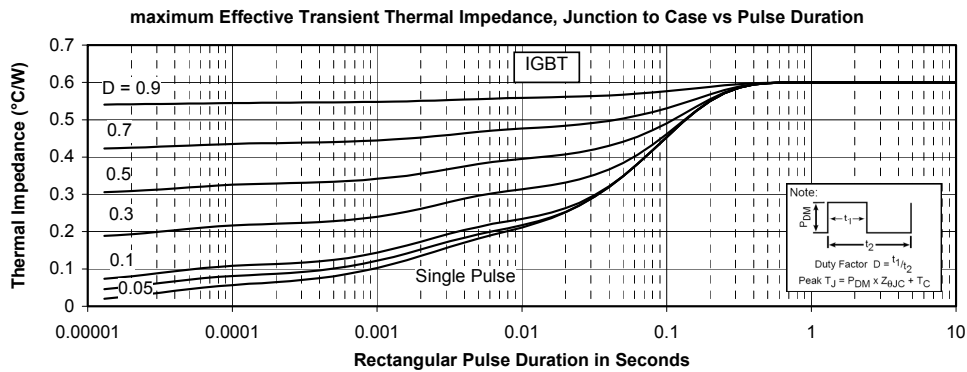
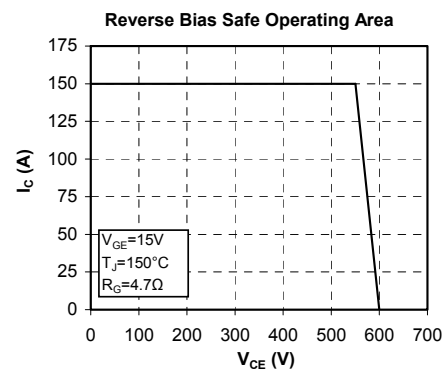
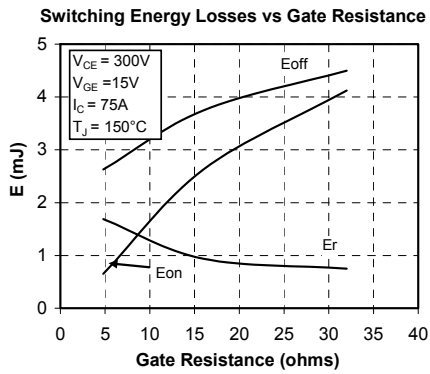
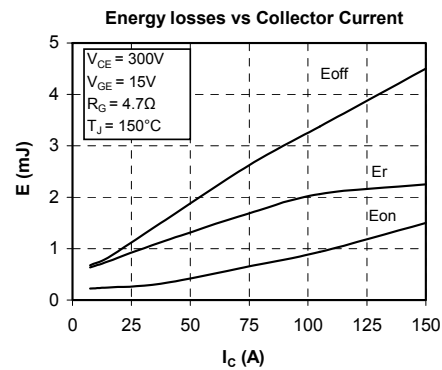
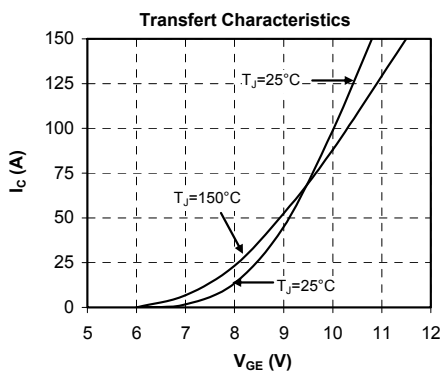
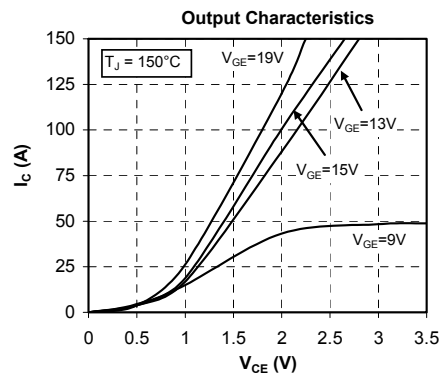
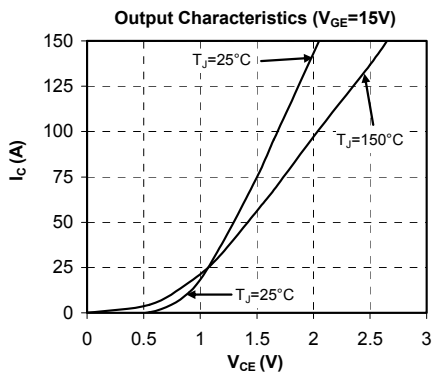
| Symbol | Characteristic | Min | Typ | Max | Unit | |
|-------------------|--|-------------|-----|-----|------|-----|
| V _{ISOL} | RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz | 4000 | | | V | |
| T _J | Operating junction temperature range | -40 | | 175 | °C | |
| T _{STG} | Storage Temperature Range | -40 | | 125 | | |
| T _C | Operating Case Temperature | -40 | | 100 | | |
| Torque | Mounting torque | To heatsink | M4 | 2 | 3 | N.m |
| Wt | Package Weight | | | | 75 | g |

Package outline (dimensions in mm)



Typical Performance Curve





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